

WHAT IS CLAIMED IS:

1. A dielectric resonator filter comprising:  
at least one dielectric resonator;  
an enclosure enclosing the dielectric resonator to

5 function as a shield against an electromagnetic field;

resonance-frequency tuning means including a conductor  
plate disposed in a space enclosed by the enclosure to have a  
first surface opposed to a surface of the dielectric  
resonator and a second surface opposed to an inner surface of  
10 the enclosure, the resonance-frequency tuning means being  
capable of changing a distance between the conductor plate  
and the dielectric resonator; and

spurious-mode suppressing means for suppressing  
propagation of a spurious electromagnetic field mode produced  
15 in a space between the second surface of the conductor plate  
and the inner surface of the enclosure.

2. The dielectric resonator filter of claim 1, wherein  
the spurious-mode suppressing means is a spurious-mode  
suppressing member filling a part of the space between the  
20 second surface of the conductor plate and the inner surface  
of the enclosure.

3. The dielectric resonator filter of claim 2, wherein  
the resonance-frequency tuning means further includes a bolt  
for changing the distance between the conductor plate and the  
25 dielectric resonator and the spurious-mode suppressing member

is composed of a ring having a screw hole for engagement with the bolt.

4. The dielectric resonator filter of claim 2, wherein the spurious-mode suppressing means is a rod supported by  
5 either of the conductor plate and the enclosure to fill the part of the space defined by the second surface of the conductor plate and the inner surface of the enclosure.

5. The dielectric resonator filter of claim 2, wherein the spurious-mode suppressing member is composed of a  
10 conductor material.

6. The dielectric resonator filter of claim 2, wherein the spurious-mode suppressing member is composed of a dielectric material.

7. The dielectric resonator filter of claim 1, wherein  
15 the spurious-mode suppressing means is composed of a resistor element having a surface portion exposed in the space between the second surface of the conductor plate and the inner surface of the enclosure to function as an electric resistor against a high-frequency induction current flowing along the  
20 surface portion.

8. A dielectric resonator filter comprising:

a plurality of dielectric resonators;

an enclosure enclosing the plurality of dielectric resonators to function as a shield against an electromagnetic  
25 field; and

a plurality of resonance-frequency tuning means provided on a one-by-one basis for the plurality of dielectric resonators, each of the plurality of resonance-frequency tuning means including a conductor plate disposed  
5 in a space enclosed by the enclosure to have a first surface opposed to a surface of the corresponding one of the dielectric resonators and a second surface opposed to an inner surface of the enclosure, the resonance-frequency tuning means being capable of changing distances between the  
10 conductor plates and the dielectric resonators,

the conductor plate of at least one of the plurality of resonance-frequency tuning means having a size different from sizes of the conductor plates of the other resonance-frequency tuning means.

15 9. The dielectric resonator filter of claim 8, wherein the conductor plate of each of the resonance-frequency tuning means has a disk-shaped configuration.

10. A dielectric resonator filter comprising:

a plurality of dielectric resonators including an  
20 input-stage dielectric resonator for receiving a high-frequency signal from an external device and an output-stage dielectric resonator for outputting the high-frequency signal to an external device;

an enclosure enclosing the plurality of dielectric  
25 resonators to function as a shield against an electromagnetic

field;

input coupling means for coupling the inputted high-frequency signal and an electromagnetic field in the input-stage dielectric resonator;

5        output coupling means for coupling the outputted high-frequency signal and an electromagnetic field in the output-stage dielectric resonator; and

an interstage-coupling tuning plate provided between those of the plurality of dielectric resonators having their  
10        respective electromagnetic fields coupled to each other to tune a strength of the electromagnetic field coupling,

at least one of both side surfaces of the interstage-coupling tuning plate having a cutaway portion provided therein.

15        11. The dielectric resonator filter of claim 10, wherein the cutaway portion in the interstage-coupling tuning plate has a generally rectangular configuration.

12. The dielectric resonator filter of claim 10, wherein the cutaway portion in the interstage-coupling tuning  
20        plate has a generally rectangular configuration having a longer side disposed to be nearly parallel to a bottom surface of the enclosure.

13. The dielectric resonator filter of claim 10, wherein the cutaway portion in the interstage-coupling tuning  
25        plate is disposed such that a vertical position of the

enclosure is nearly coincident with positions at which the dielectric resonators are disposed.

14. The dielectric resonator filter of claim 10, wherein the cutaway portion in the interstage-coupling tuning plate is formed to be in contact with an inner side surface of a wall composing an outer circumferential portion of the enclosure.

15. The dielectric resonator filter of claim 10, further comprising an interstage-coupling tuning member disposed in the enclosure to protrude toward the cutaway portion in the interstage-coupling tuning plate.

16. The dielectric resonator filter of claim 10, wherein each of the plurality of dielectric resonators is a TE<sub>01δ</sub>-mode resonator.

17. A method for suppressing a spurious mode in a dielectric resonator filter comprising at least one dielectric resonator and an enclosure enclosing the dielectric resonator to function as an electromagnetic field shield, the method comprising the steps of:

(a) disposing, in a space enclosed by the enclosure, resonance-frequency tuning means including a conductor plate having a first surface opposed to a surface of the dielectric resonator and a second surface opposed to an inner surface of the enclosure to tune a resonance frequency by changing a distance between the conductor plate and the dielectric

resonator; and

(b) after or prior to the step (a), disposing a spurious-mode suppressing member for suppressing propagation of a spurious electromagnetic field mode produced in a space  
5 between the second surface of the conductor plate and the inner surface of the enclosure.

18. The method of claim 17, wherein the step (b) includes disposing the spurious-mode suppressing means to fill a part of the space between the second surface of the  
10 conductor plate and the inner surface of the enclosure.